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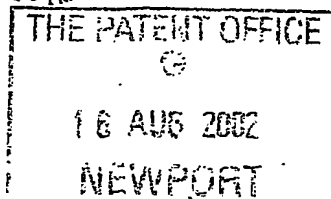
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1/77

Request for grant of a patent

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16AUG02 E741507-1 D024510 8QQ
P01/7706 0.00 0219066.8

1. Your reference

P31273-/MGO/JDB

2. Patent application number

(The Patent Office will fill in this part)

0219066.8

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Scott-Track Limited
68-82 Boden Street
Glasgow
G40 3PX

Patents ADP number (*if you know it*)

8447161001

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

4. Title of the invention

"Turnout/Crossover Section for Railway Track"

5. Name of your agent (*if you have one*)

Murgitroyd & Company

"Address for service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)

Scotland House
165-169 Scotland Street
Glasgow
G5 8PL

Patents ADP number (*if you know it*)

1198015 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (*if you know it*) the or each application number

Country

Priority application number
(*if you know it*)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (*Answer 'Yes' if:*

Yes

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
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Description 16

Claim(s) -

Abstract -

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Priority documents -

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Statement of inventorship and right to grant of a patent (Patents Form 7/77) -

Request for preliminary examination and search (Patents Form 9/77) -

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Any other documents (please specify) -

11. I/We request the grant of a patent on the basis of this application.

Signature  Date 15/08/02

Murgitroyd & Company

12. Name and daytime telephone number of person to contact in the United Kingdom

James D Brown

01224 706616

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1 "Turnout/Crossover Section for Railway Track"

2

3 The present invention relates to a turnout or
4 crossover section of railway track and particularly
5 but not exclusively relates to providing a temporary
6 non-intrusive turnout or crossover section of a
7 railway track.

8

9 Railway track requires to be maintained at regular
10 intervals and in order to do this, the section of
11 track that is being maintained must be cleared of
12 trains. This is done by transferring the trains
13 from the track having the maintenance performed on
14 it onto an adjacent track for a limited period (i.e.
15 a few hours). The trains are transferred onto the
16 adjacent track by means of a crossover section of
17 track. Conventionally, crossover sections are
18 intrusive in that the section of track at which the
19 crossover section is inserted must be cut; this
20 involves cutting the inside rail twice of each
21 railway track and installing the temporary crossover
22 and also installing the switchgear along with

1 providing an interface for signalling. However,
2 such an intrusive crossover section is relatively
3 expensive and requires a fairly long time to plan.
4 The only other known alternative to solve this
5 problem is to allow the trains to crossover at the
6 nearest permanent crossover section but this may be
7 many miles away and thus if repair or maintenance is
8 required on only a few metres of track, trains may
9 be forced to share one line of track for both
10 directions for many miles or extensively diverted,
11 thus leading to inefficiency and delays.

12
13 Those in the rail industry will also realise that
14 there is a conflict between passengers who require
15 train services during the daytime and freight trains
16 which operate during the night and thus there is
17 very little time to effect such repairs and
18 maintenance.

19
20 According to a first aspect of the present invention
21 there is provided a turnout for a railway track, the
22 turnout comprising a raised track surface which is
23 adapted to provide a path along which the wheels of
24 a train can travel from one railway track to
25 another, wherein the raised track surface is of a
26 sufficient height such that the wheels of the train
27 are arranged to clear the said railway track.

28
29 According to a second aspect of the present
30 invention there is provided a method of transferring
31 a train from one railway track to a second railway
32 track, the method comprising the steps of:-

1 providing a raised track surface which is adapted to
2 provide a path along which wheels of the train can
3 travel from the first to the second railway track;
4 driving the train along the first track and onto the
5 raised track surface, wherein the raised track
6 surface is of a sufficient height such that the
7 wheels of the train are arranged to clear at least
8 one (and preferably both) of the first and second
9 railway tracks.

10

11 Typically, the turnout further comprises a ramp
12 surface, wherein, the ramp surface is preferably
13 tapered from a short or no height end to a
14 relatively tall height end. Most preferably, the
15 ramp surface comprises a linear taper from the short
16 or no height end to the relatively tall height end
17 and preferably the relatively tall height end is of
18 the same height as that of the raised track surface.
19 Typically, the relatively tall height end of the
20 ramp surface is adjacent an end of the raised track
21 surface, the two combining to provide a path along
22 which the wheel is permitted to travel.

23

24 Preferably, at least a portion of the raised track
25 surface has a slot formed therein wherein the slot
26 is preferably arranged to lie over or around the
27 rail being crossed and is releasably fixed thereto.

28

29 Typically, there may be two turnouts provided spaced
30 apart along two railway tracks, the first turnout
31 providing a path along which the wheels of a train
32 can travel from a first railway track to a second

1 railway track, and the second turnout providing a
2 path along which the wheels of the train can travel
3 from the second railway track back to the first
4 railway track.

5
6 Typically, at least a portion of the raised track
7 surface, which is preferably the same portion as
8 before, is formed on top of a raised crossover
9 member, wherein the height of the raised crossover
10 member at least equals the depth of a flange portion
11 of the wheel of the train.

12
13 Typically, the raised track surface comprises a
14 plurality of rail members, one or more of which
15 comprise a curved radius away from one of the
16 railway tracks towards the other railway track.

17
18 Preferably, the plurality of rail members are
19 releasably secured to the first and/or second
20 railway tracks by a fixing means which may comprise
21 a clamping means.

22
23 Preferably, the one or more turnouts are temporary
24 turnouts and more preferably are non-intrusive
25 turnouts.

26
27 Embodiments of the present invention will now be
28 described, by way of example only, with reference to
29 the accompanying drawings, in which:-

30
31 Fig. 1 is a plan view of a temporary turnout in
32 accordance with the present invention;

1 Fig. 2 is a plan view of a portion of the
2 turnout of Fig. 1 highlighted as detail 1;
3 Fig. 3a is a cross-sectional view across
4 section B-B of Fig. 2;
5 Fig. 3b is a side view of a portion of the
6 turnout shown in the direction of A-A of Fig.
7 2;
8 Fig. 4 is a close up view of a G-clamp
9 indicated in Fig. 6 as detail 2;
10 Fig. 5 is a close up view of a G-clamp of Fig.
11 7a indicated as detail 3;
12 Fig. 6 is a cross-sectional view across section
13 C-C of Fig. 1;
14 Fig. 7a is a cross-sectional view across
15 section D-D of Fig. 1;
16 Fig. 7b is a side view of the portion of the
17 turnout shown in Fig. 7a;
18 Fig. 8 is a cross-sectional view across section
19 E-E of Fig. 1;
20 Fig. 9a is a close up plan view of the portion
21 of the turnout indicated in Fig. 1 as detail 4;
22 Fig. 9b is a cross-sectional view across
23 section F-F of Fig. 9a;
24 Fig. 10 is a perspective view photograph of a
25 scale model of a temporary non-intrusive
26 turnout in accordance with the present
27 invention during installation;
28 Fig. 11 is a perspective view photograph of the
29 turnout section of Fig. 10 further on during
30 construction;

1 Fig. 12 is a perspective view photograph of the
2 turnout section of Fig. 11 further on during
3 construction;

4 Fig. 13 is a perspective view photograph of the
5 turnout section of Fig. 12 further on during
6 construction;

7 Fig. 14 is a plan view photograph of one end of
8 the turnout section of Fig. 13;

9 Fig. 15 is a perspective view photograph of a
10 model taking the place of a train as it enters
11 the turnout section of Fig. 14;

12 Fig. 16 is a perspective view photograph of the
13 model of Fig. 15 as it progresses through the
14 turnout section;

15 Fig. 17 is a perspective view photograph of the
16 model of Fig. 16 as it progresses further
17 through the turnout section; and

18 Fig. 18 is a perspective view photograph of the
19 model of Fig. 17 as it nears the end of the
20 turnout section.

21

22 Fig. 1 shows a non-intrusive turnout generally
23 indicated as 10 in accordance with the present
24 invention. It will be appreciated by the reader
25 that two spaced apart non-intrusive turnouts 10 are
26 utilised on a section of track to provide a non-
27 intrusive crossover.

28

29 As shown in Fig. 1, the temporary non-intrusive
30 turnout 10 links a south bound rail track 12 and a
31 north bound rail track 14, such that a train (not
32 shown) which has already been transferred from the

1 south bound rail track 12 to travel south along the
2 north bound rail track 14 can be transferred back
3 onto the south bound rail track 12. In this manner,
4 the portion of the south bound rail track 12' can be
5 repaired/maintained. The skilled reader will
6 realise that other routes of transfer could be
7 installed and adopted.

8
9 The temporary non-intrusive turnout 10 comprises a
10 number of components which will now be described.

11
12 The non-intrusive turnout 10 comprises a pair of
13 turnout tracks 16, 18 and a plurality of temporary
14 sleepers 20. For ease of reference, the turnout
15 track 16 will be referred to as the left hand
16 turnout track 16 and the turnout track 18 will be
17 referred to as the right hand turnout track 18.

18
19 The left hand turnout track 16 comprises, from the
20 left hand end of the Fig. 1, a ramp rail 22L. The
21 uppermost portion of the ramp rail 22L is wedge
22 shaped, with the uppermost surface tapering linearly
23 from its left most end which has a height of 0mm up
24 to its right most end which has a height of
25 approximately 50mm and this linear tapering can be
26 best seen in Fig. 7B which shows that the ramp rail
27 22 has a sufficient length, in the region of 1700mm,
28 such that the angle of tapering is relatively
29 gradual. The ramp rail 22L is coupled to the north
30 bound left hand rail track 14L by means of a G-clamp
31 mechanism 32 as shown in Fig. 5; it should be noted
32 however that other types of clamp mechanisms could

1 be utilised. The ramp rail 22 comprises a head
2 portion 51 which rests on top of the upper flat
3 surface of the rail track 12, 14. A neck portion 53
4 extends downwardly from the inner most edge of the
5 head portion 51, where the neck portion 53 is shaped
6 to substantially match the shape of the inside face
7 of the rail track 12, 14.

8

9 The G-clamp mechanism 32 comprises a G-shaped clamp
10 34, one end of which surrounds and is compressed
11 against, the opposite upstanding face of the rail
12 track 12, 14 to the neck portion 53. A vice 36
13 extends toward the neck portion 53 of the ramp rail
14 22 from the other end of the G-shaped clamp 34, such
15 that the vice 36 can be forced or urged into secure
16 connection with the neck portion 53. Preferably,
17 the vice 36 is of a type that can be readily
18 assembled and disassembled in a short amount of
19 time.

20

21 Following on from the ramp rail 22L from left to
22 right, the left hand turnout track 16 next comprises
23 a switch rail 24L, the left hand most end of which
24 is arranged to butt against the right hand most end
25 of the ramp rail 22L, as shown in Fig. 7b. As shown
26 in Fig. 6, the switch rail 24L, 24R comprises a
27 respective head portion 55L, 55R and the switch rail
28 24L, 24R is inwardly curved along its length, toward
29 the south bound rail track 12 and thus away from the
30 north bound rail track 14. In other words, the end
31 of the switch rail 24L adjacent to the ramp rail 22L
32 is located directly above the north bound rail track

1 14L whilst the opposite end of the switch rail 24L
2 is displaced from the north bound rail track 14L.
3 Nevertheless, the head portion 55L comprises a
4 linear height of approximately 50mm arranged
5 horizontally along its length. The switch rail 24L
6 also comprises a neck portion 57L. Conveniently,
7 and as shown in Fig. 4, the neck portion 57L may
8 have a slot formed in it at the end of the switch
9 rail 24L closest to the ramp rail 22L, such that the
10 upper most portion of the north bound rail track 14L
11 can protrude inwardly through said slot.
12 Alternatively, the slot may be omitted, with the
13 neck portion 57L following the shape of the inside
14 face of the north bound rail track 14L. The switch
15 rail 24L is secured in a releasable fashion to the
16 north bound rail track 14L by means of a G-clamp
17 mechanism 62 which operates in a similar fashion to
18 the G-clamp mechanism 32 of Fig. 5. The G-clamp
19 mechanism 62 as shown in Fig. 4 comprises a similar
20 G-shaped clamp 64 and a vice 66. The switch rail
21 24L is supported at its middle and right hand most
22 end from underneath by the G-clamp mechanism 62 and
23 temporary sleepers 20. It should be noted that the
24 term "inside face" is used in the sense that it is
25 the face that the respective turnout track 16, 18 is
26 being turned away from.

27
28 Following on from the switch rail 24L from left to
29 right, the left hand turnout track 16 next comprises
30 a gutt rail 26L. The gutt rail 26L has an I-shaped
31 cross-section which is broadly similar to the I-
32 shaped cross-section of a normal rail track such as

1 12, 14. The gutt rail 26L continues to bend at
2 approximately the same radius as the bend radius of
3 the switch rail 24L. The clamping mechanism of the
4 gutt rail 26L to the north bound rail track 14L is
5 similar to that as shown in Fig. 8 which will be
6 described subsequently. Again, the gutt rail 26L is
7 supported from underneath by the clamping mechanism
8 and temporary sleepers 20 to have its upper flat
9 horizontal surface to be approximately 50mm above
10 the south bound 12 and hence north bound 14 rail
11 tracks.

12
13 Up until this point, the right hand turnout track 18
14 substantially mirrors that of the left hand turnout
15 track 16, since the right hand turnout track 18
16 comprises, from left to right in Fig. 1, a ramp rail
17 22R, a switch rail 24R and a gutt rail 26R.

18
19 The left hand turnout track 16 from left to right
20 after the gutt rail 26L comprises a straight rail
21 28L which thus has no bend radius and which once
22 again is supported by the temporary sleepers 20 to
23 have its upper flat horizontal surface to be
24 approximately 50mm above the south bound 12 and
25 hence north bound 14 rail tracks.

26
27 Following immediately on from the straight rail 28L,
28 the left hand turnout track 16 comprises a crossing
29 rail 30L which is broadly similar to the crossing
30 rail 30R which will be described subsequently.

31

1 Immediately following on from the gutt rail 26R, the
2 right hand turnout track 18 comprises a crossing
3 rail 30R which is shown in more detail in Fig. 2 and
4 Figs. 3A and 3B. The crossing rail 30R comprises a
5 substantially I-shaped cross-section toward and at
6 both its ends which is substantially the same I-
7 shaped cross-section as the existing south bound 12
8 and north bound 14 rail track. Thus, towards and at
9 its ends, the crossing rail 30R comprises a head
10 portion 59 and a neck portion 61. However, a slot
11 or gap 31 is provided along a portion of the length
12 of the crossing rail 30R about the mid point of the
13 crossing rail 30R such that there is no neck portion
14 61 in the region of the slot 31 as shown most
15 clearly in Fig. 3B. The crossing rail 30R is
16 arranged to lie across the north bound rail track
17 14L such that the north bound rail track 14L lies
18 within the slot 31. Accordingly, since the crossing
19 rail 30R is again supported from underneath by the
20 temporary sleepers 20 to have its head portion 59
21 with a height of approximately 50mm and since the
22 crossing rail 30R is arranged to be horizontal, the
23 upper most surface of the crossing rail 30R is
24 approximately 50mm higher than the upper most
25 surface of the south bound 12 and north bound 14
26 rail tracks.

27

28 The right hand turnout track 18 next comprises from
29 left to right and immediately after the crossing
30 rail 30R, a straight rail 28R which is substantially
31 identical in function and arrangement to the
32 straight rail 28L previously described. Similarly,

1 the crossing rail 30L is substantially identical to
2 the crossing rail 30R in function and arrangement
3 except that the crossing rail 30L crosses over the
4 south bound rail track 12R.

5
6 The left hand turnout track 16 follows on from left
7 to right after the crossing rail 30L with a gutt
8 rail 42L which is followed by a switch rail 44L
9 which is in turn followed by a ramp rail 46L which
10 are respectively substantially identical to the gutt
11 rails 26L, switch rail 24L and ramp rail 22L in
12 function and arrangement.

13
14 The right hand turnout track 18 follows on from the
15 straight rail 28R from left to right with a gutt
16 rail 22R which is followed by a switch rail 44R
17 which is in turn followed by a ramp rail 46R which
18 are respectively substantially identical in function
19 and arrangement to the gutt rail 26R, the switch
20 rail 24R and the ramp rail 22R.

21
22 As shown in Fig. 8, the gutt rails 42L, 42R (and
23 thus the gutt rails 26L, 26R) are clamped to the
24 south bound rail tracks 12L, 12R by means of a J
25 block arrangement 68L, 68R and a lengthened G-clamp
26 mechanism 70L, 70R. The J block arrangement 68L and
27 G-clamp mechanism 70L will now be described, but
28 those skilled in the art will realise that the J
29 block arrangement 68R and G-clamp mechanism 70R are
30 substantially identical to the J block arrangement
31 68L and G-clamp mechanism 70L except that they are
32 rotated through 180°. The gutt rail 42L is spaced

1 apart from the south bound rail track 12L by means
2 of the J block arrangement 68L which is preferably
3 formed from any hard material that is shaped to fit
4 into the heart of the rail to maintain a set
5 distance between the rails. As shown in Fig. 8, the
6 J block arrangement 68L is arranged such that it not
7 only spaces the gutt rail 42L horizontally apart
8 from the south bound rail track 12L but it also
9 spaces them vertically apart, such that the upper
10 most horizontally arranged surface of the gutt rail
11 42L is approximately 50mm vertically above the upper
12 most horizontally arranged surface of the south
13 bound rail track 12L. The G-clamp mechanism 70L
14 clamps the gutt rail 42L to the south bound rail
15 track 12L via the J block arrangement 68L and the G-
16 clamp mechanism 70L once again comprises a vice 76L
17 or a bolted fixing through the rail 12L, 42L and J
18 block arrangement 68L or similar arrangement..
19
20 It should be noted that, as shown in Fig. 9A, the
21 left hand 16 and right hand 18 turnout tracks may be
22 provided with a pot sleeper arrangement 80, where
23 the two pot sleeper arrangements 80L, 80R are
24 coupled to one another via a rigid frame 82L, 82R,
25 where the rigid frame 82L, 82R may be provided in
26 two halves, 82L, 82R which are coupled to one
27 another at their outer most ends via a suitable
28 fixing means 84 such as nuts and bolts (not shown).
29 Thus, the pot sleeper arrangement 80L, 80R can be
30 used either to replace the temporary sleepers 20 or
31 could be provided on top of an in-situ or existing

1 timber sleeper, in order to provide increased
2 rigidity to the non-intrusive temporary turnout 10.

3
4 Fig. 10 shows a scale model of a non-intrusive
5 turnout 10 part way through construction; it should
6 be noted however that the scale model shown in Fig.
7 10 omits the straight rails 28L, 28R and also the
8 switch rails 44L, 44R but it is envisaged that the
9 straight 28L, 28R and switch 44L, 44R rails would be
10 used in a full size rail track 12, 14.

11
12 Fig. 10 shows that a couple of temporary sleepers 20
13 have been laid, and the gutt rails 42L, 42R have
14 been secured to the temporary sleepers 20 and also
15 secured to the south bound track 12L, 12R. It
16 should also be noted that the gutt rails 42R are in
17 essence longer versions of the switch rails 44L, 44R
18 in the model shown in Fig. 10 through Fig. 18. The
19 crossover rail 30L has also been installed such that
20 it crosses over the south bound rail track 12R.

21 Fig. 11 shows that the gutt/switch rail 26L has been
22 installed next and is followed by installation of
23 the gutt/switch rail 26R in Fig. 12 and is followed
24 by the crossover rail 30R as shown in Fig. 13.

25 Thereafter, the ramp rails 22L, 22R are secured to
26 the respective north bound rail tracks 14L, 14R.

27
28 A model of a train 5 is shown in Fig. 15 as having
29 travelled south along the north bound rail track 14
30 and having mounted the ramp rails 22L, 22R. It is
31 important to note that the ramp rails 22L, 22R raise
32 the wheels of the train (not shown) and thus the

1 model train 5 by an amount sufficient such that the
2 flanged part of the wheel is just vertically above
3 the height of the rest of the normal track 14L, 14R.
4 Thus, and as shown in Fig. 16, when the model train
5 5 moves onto the crossing rails 30L, 30R, the left
6 hand 16 and right hand 18 turnout tracks are of a
7 sufficient height such that the flanged part of the
8 wheel 7, which normally acts to keep the model train
9 5 and thus full size trains on the tracks, is able
10 to clear the north bound rail track 14L and then the
11 south bound rail track 12R. The model 5 is shown in
12 Fig. 17 as continuing through the non-intrusive
13 temporary turnout 10 until it reaches the position
14 shown in Fig. 18 which shows the model 5 about to
15 travel down the ramp rails 46L, 46R and then onward
16 as per normal south along the south bound rail track
17 12.

18
19 The embodiment of the non-intrusive turnout 10
20 described herein has the great advantage that the
21 rail tracks 12R and 14L do not require to be cut
22 which would be normal if a conventional intrusive
23 temporary turnout was to be inserted in to the
24 tracks 12, 14. Furthermore, those skilled in the
25 art will appreciate that, if a train requires to
26 pass through the non-intrusive temporary turnout 10
27 without actually crossing over from one track 12
28 onto another track 14, the ramp rails 22 or 46 as
29 required can be removed along with the respective
30 switch rails 24 or 44 and crossing rail 30L or 30R
31 and as such the train will be able to bypass the
32 non-intrusive temporary turnout 10.

1
2 Modifications and improvements may be made to the
3 embodiments described herein without departing from
4 the scope of the invention. For instance, the
5 height of approximately 50mm of the various
6 components of the non-intrusive temporary turnout 10
7 can be varied to suit the flanges provided on the
8 wheels of trains in different countries and may be
9 adapted to accommodate various track gauges. Those
10 skilled in the art will realise that the height of
11 the various components simply needs to be equal to,
12 or more preferably just slightly higher than the
13 extent of the flange provided on the wheels of
14 trains in each particular country.

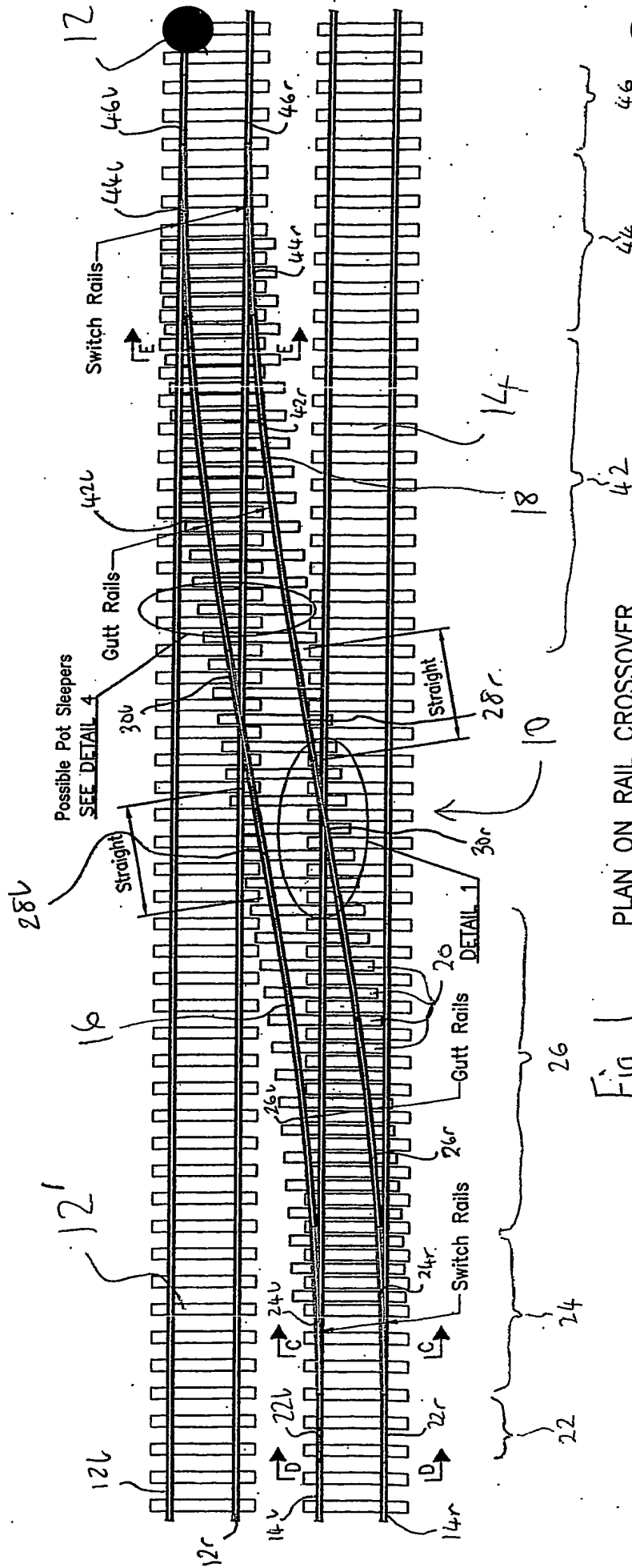


Fig. 1

PLAN ON RAIL CROSSOVER

Scale 1:100

2/13

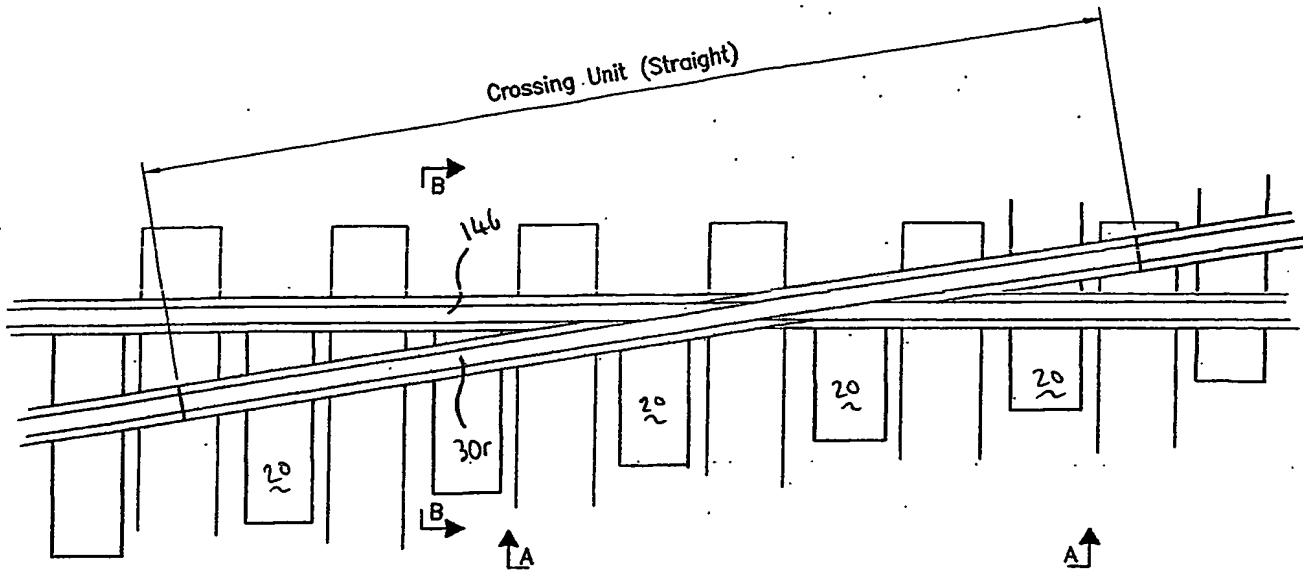
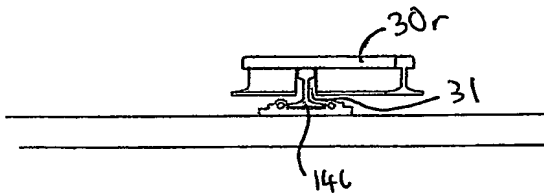


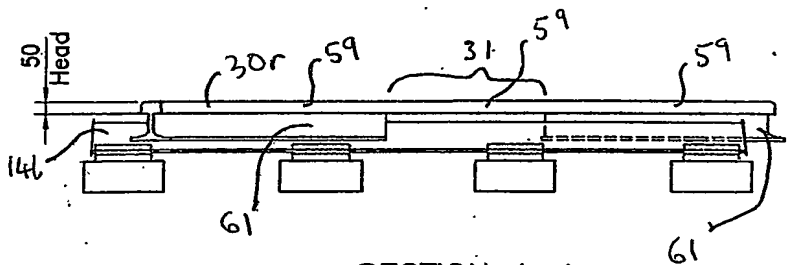
Fig. 2

DETAIL 1
(SIM 2 PLACES)
Scale 1:20



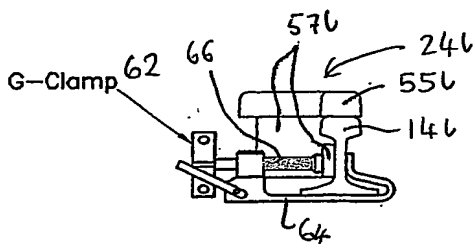
SECTION B-B
Scale 1:20

Fig. 3(a)



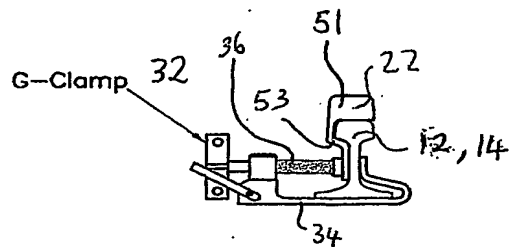
SECTION A-A
Scale 1:20

Fig. 3(b)



DETAIL 2
Scale 1:10

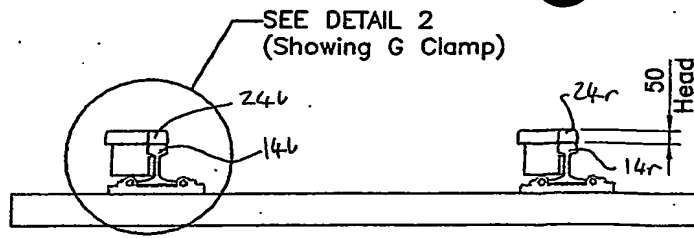
Fig. 4



DETAIL 3
Scale 1:10

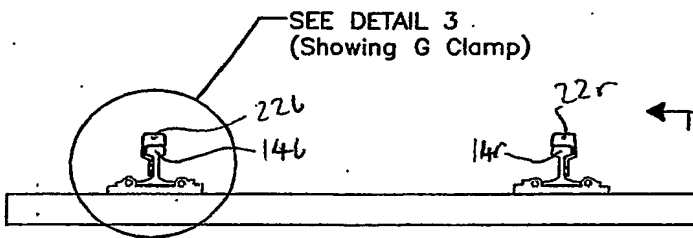
Fig. 5

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SECTION C-C
Scale 1:20

Fig. 6



SECTION D-D
Scale 1:20

Fig. 7(a)

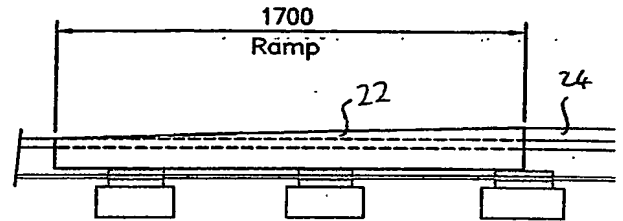
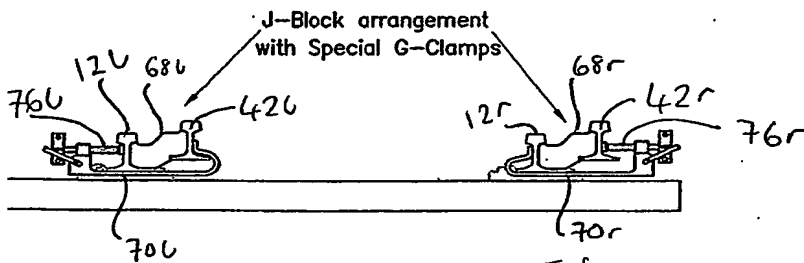


Fig. 7(b)



SECTION E-E
Scale 1:20

Fig. 8

Fig. 9(a)

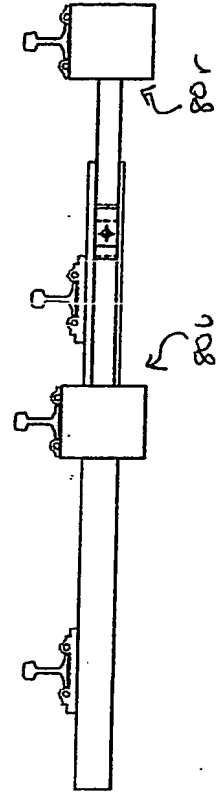
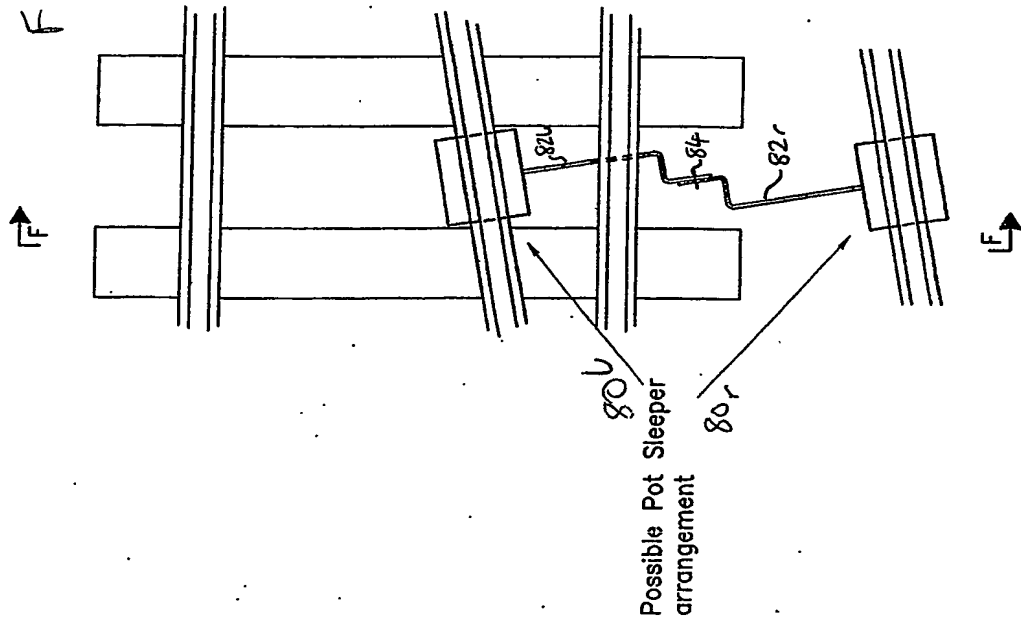


Fig. 9(b) SECTION F-F
Scale 1:20

DETAIL 4
Scale 1:20

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18

20

300

300

20

20

20

426

~12r

746

~14r

426

Fig. 10

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200

306

400

Fig. 11

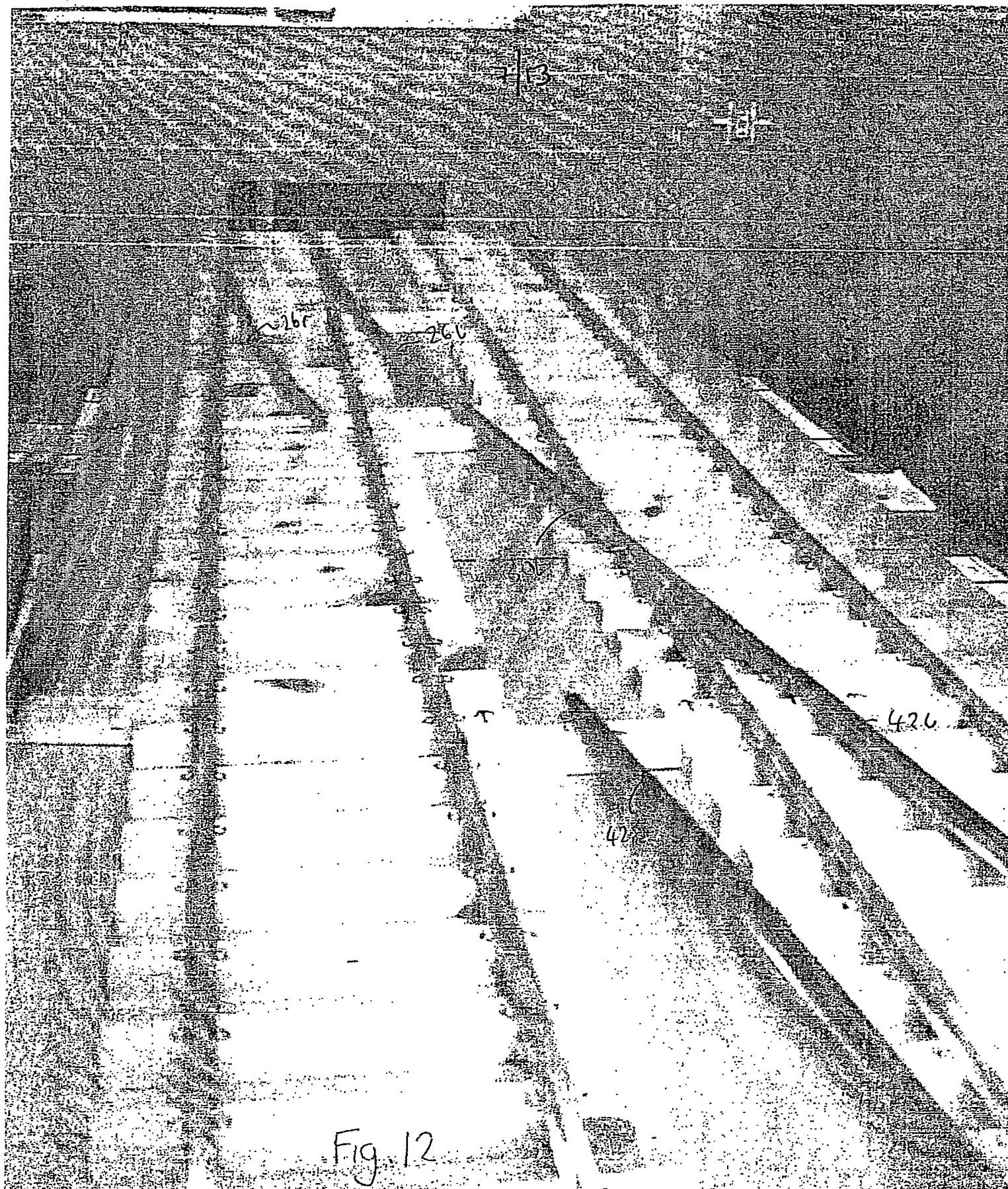


Fig. 13

426

42

306

30

30

30

30

30

30

30

30

30

30

30

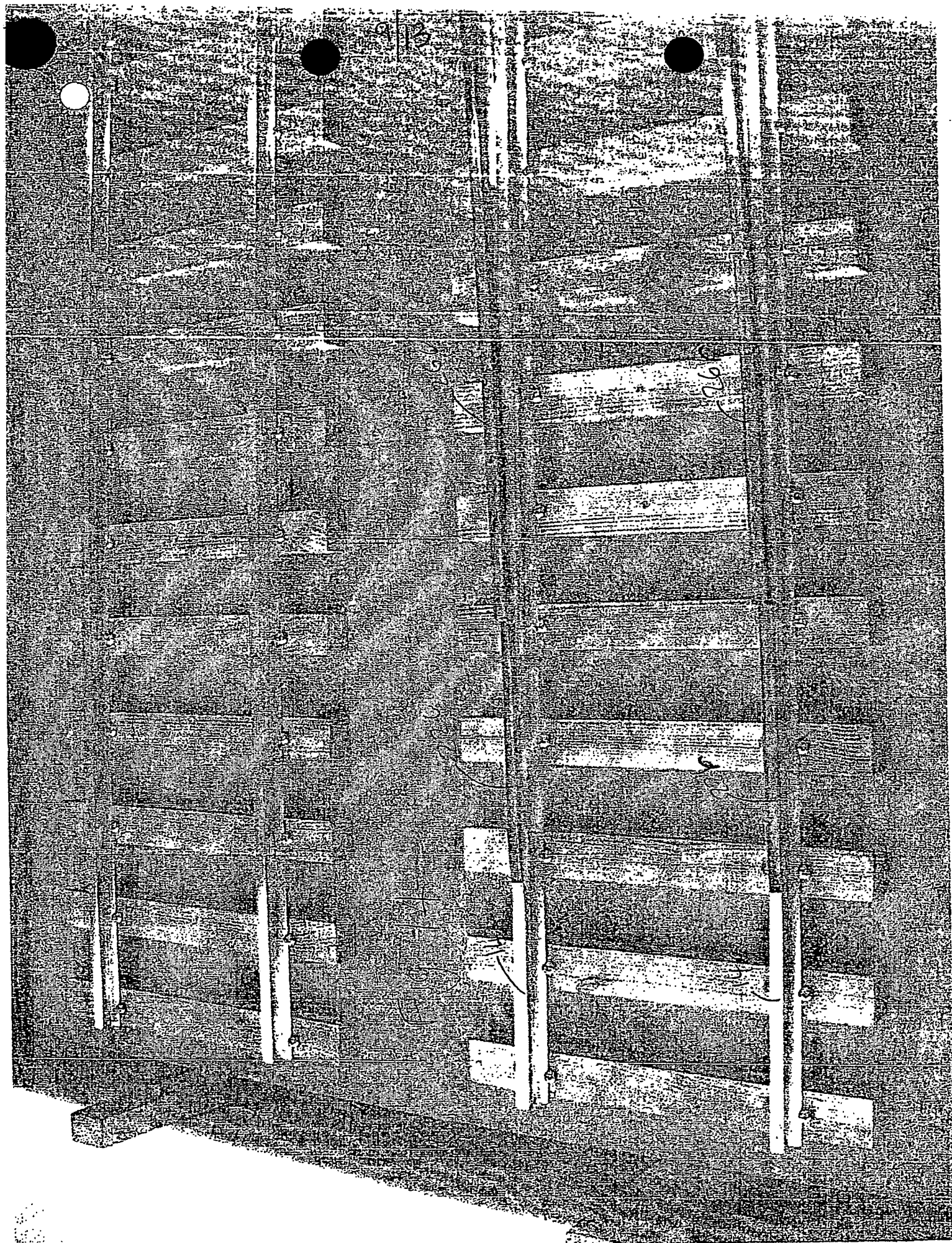
30

30

30

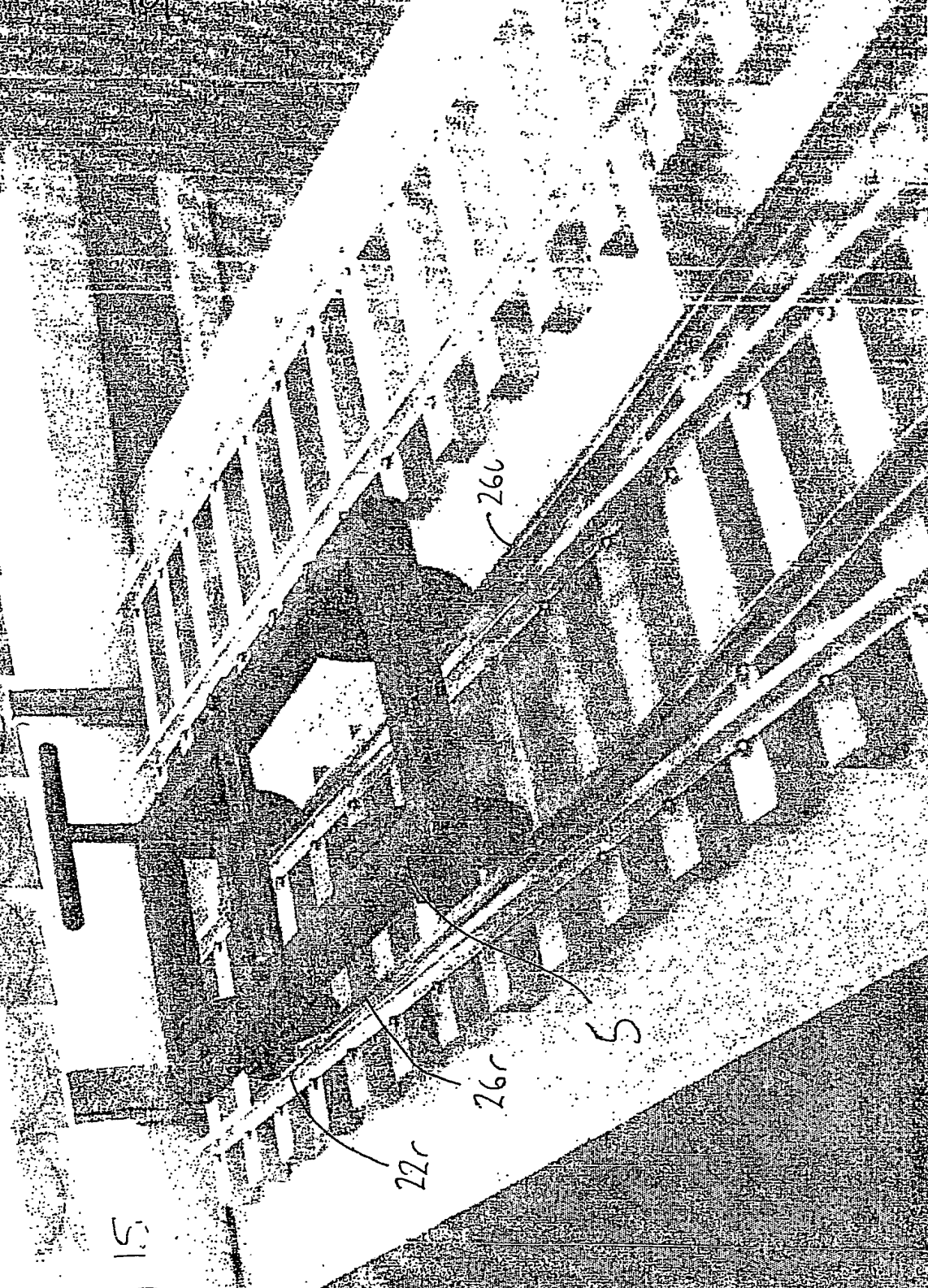
30

30



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Fig 15



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121

301

121

(5)

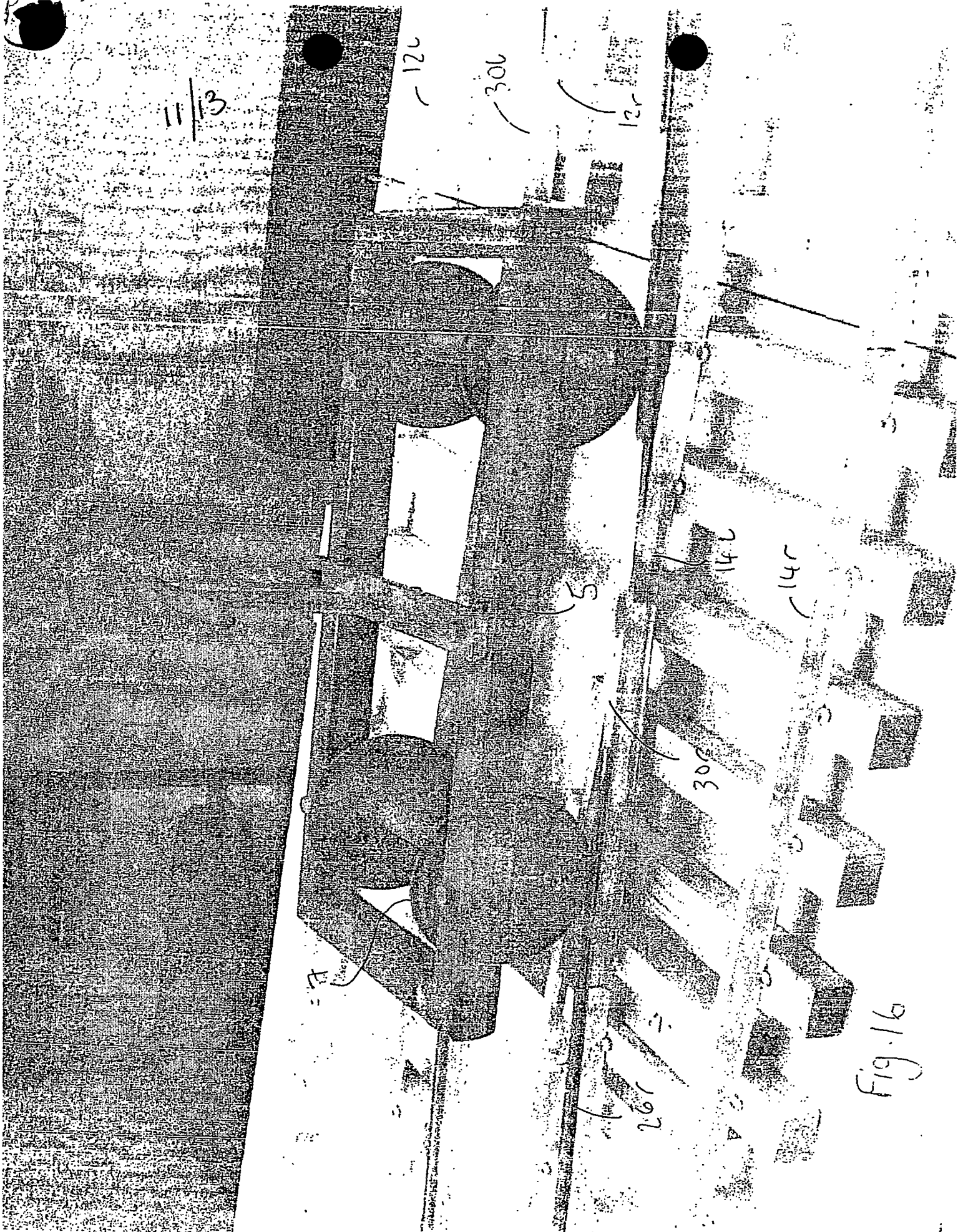
141

141

301

121

Fig. 16



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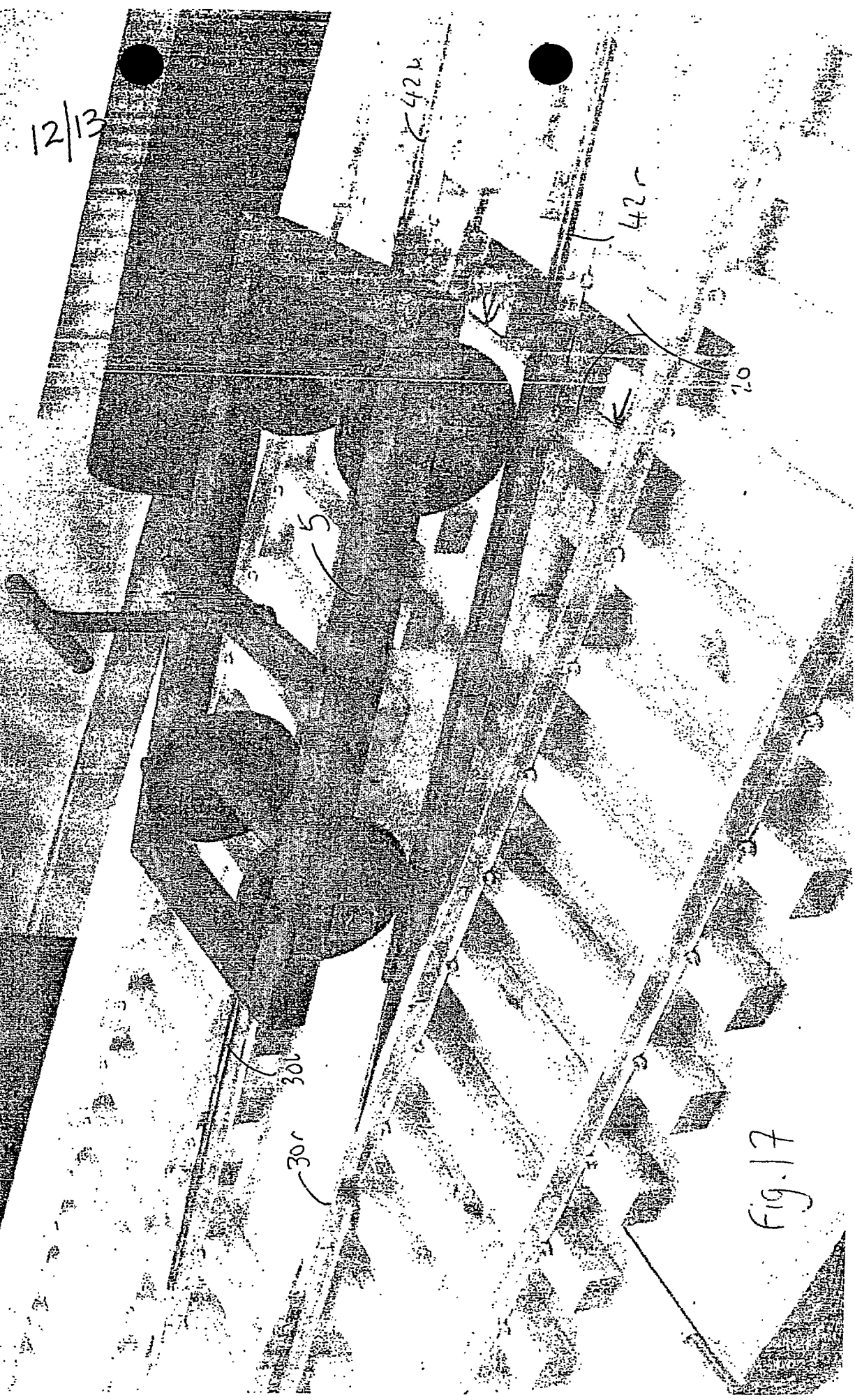
424

422

42

30r 30l

Fig. 17



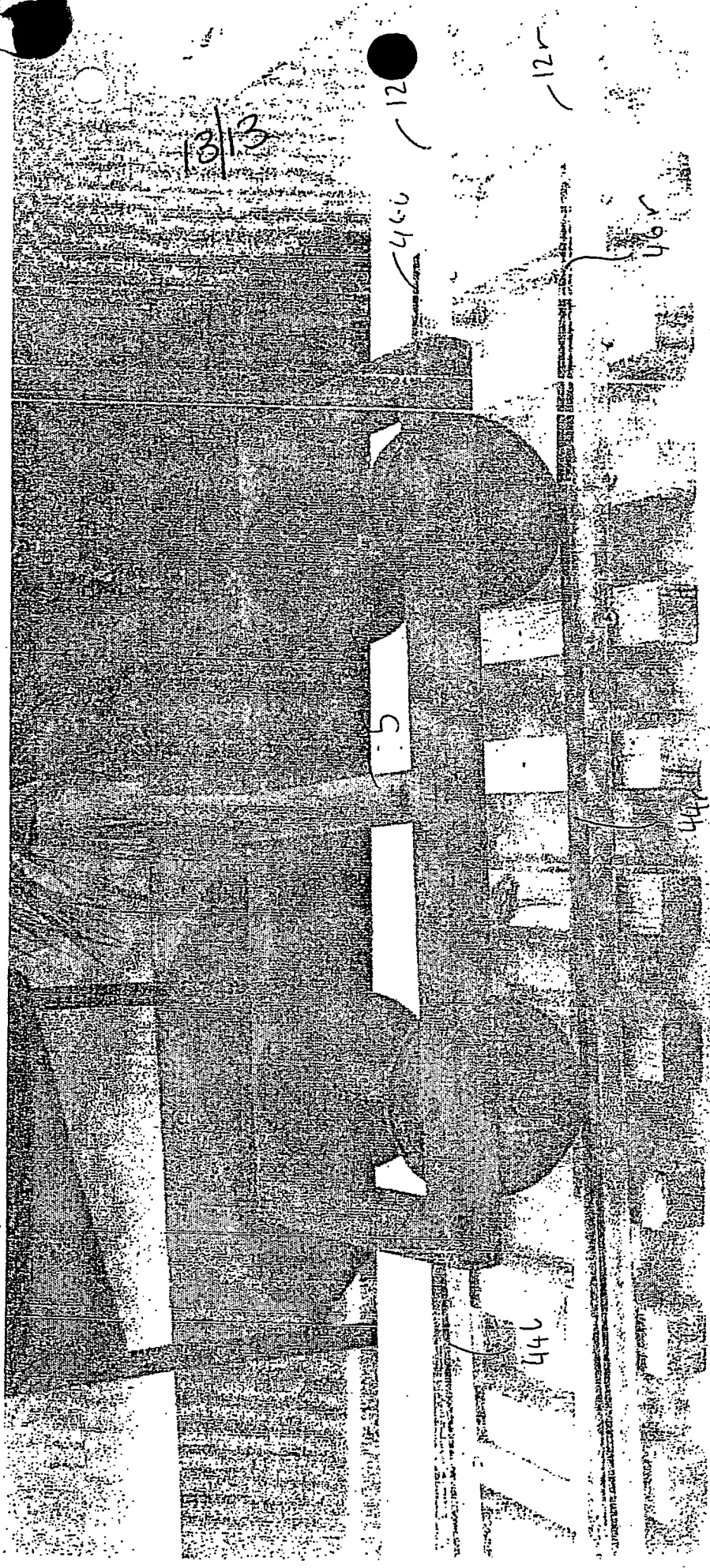
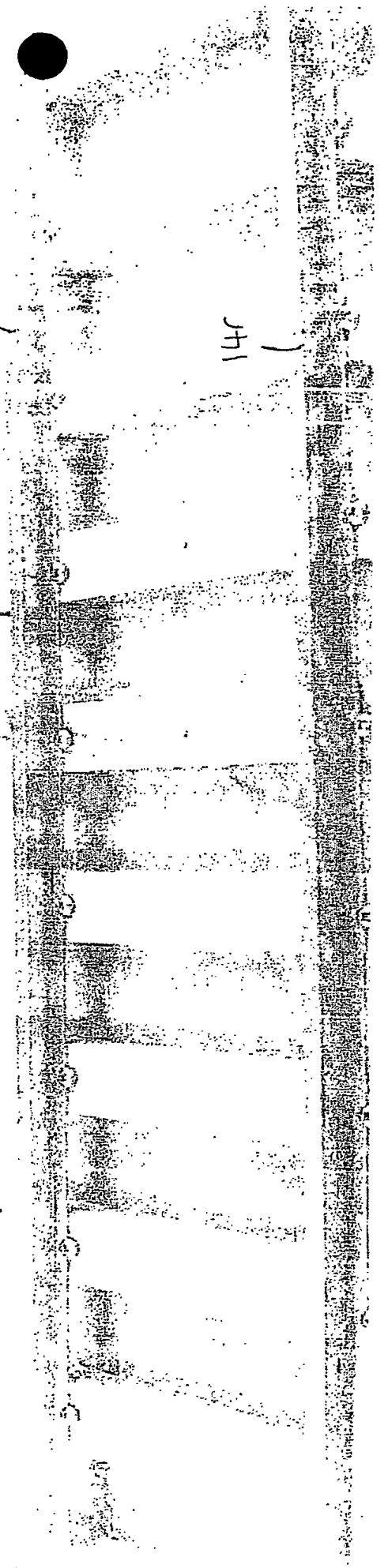


Fig. 18



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